Documentation of a rare low precipitation supercell in the Tennessee Valley

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Overview

- What is an LP supercell?
- Synoptic briefing
- Near Storm Environment
- Visual storm observations (relationship to NSE)
- Radar presentation

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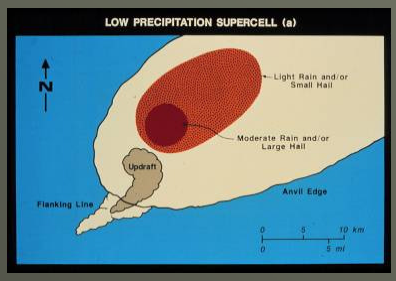
What is an LP supercell?

From Bluestein and Parks, 1983

1. Little (if any) precip falling under cloud base; no evidence of any strong downdraft at the surface.
2. Proximity to a dryline.
3. Evidence of intense updrafts at the storms' rear flank.
4. Large hail falling outside the main cumuliform tower.
5. Tornadoes.

What is an LP supercell?



Taken from Doswell and Burgess, 1993

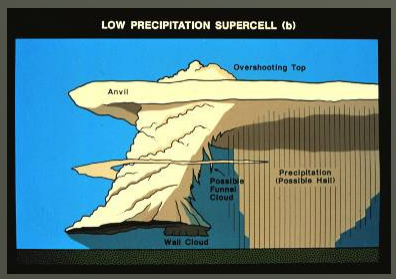


Photo by Greg Michels, NWS MQT


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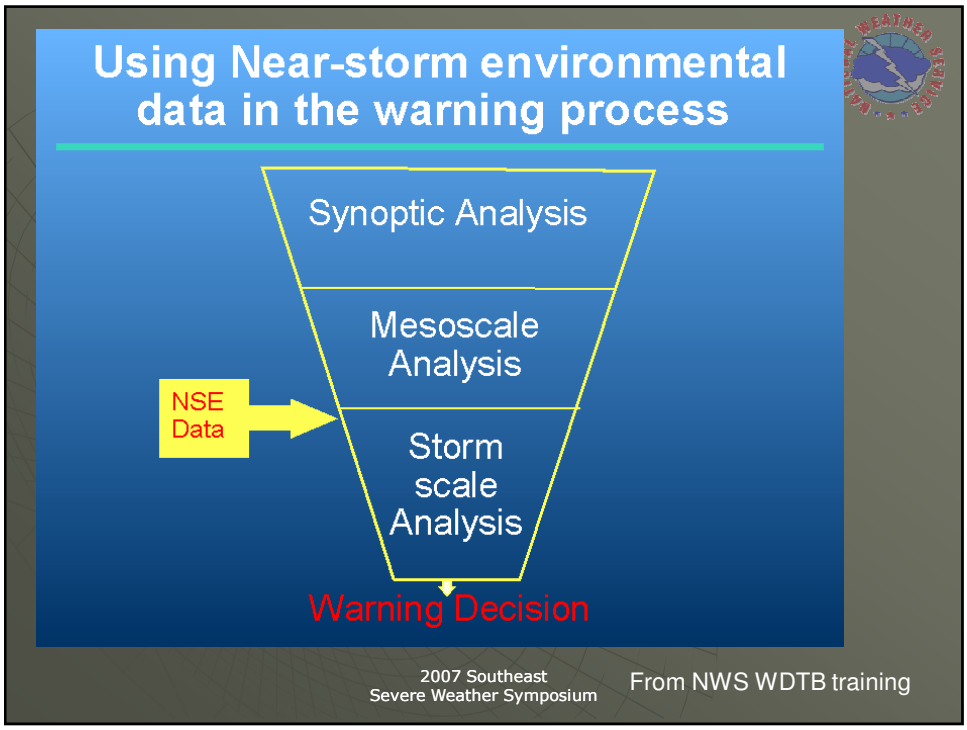
Photo courtesy Helge Tuschy
Photo courtesy Dave Chapman


Using Near-storm environmental data in the warning process
Synoptic Analysis
Mesoscale Analysis
NSE Data
Storm scale Analysis
Warning Decision
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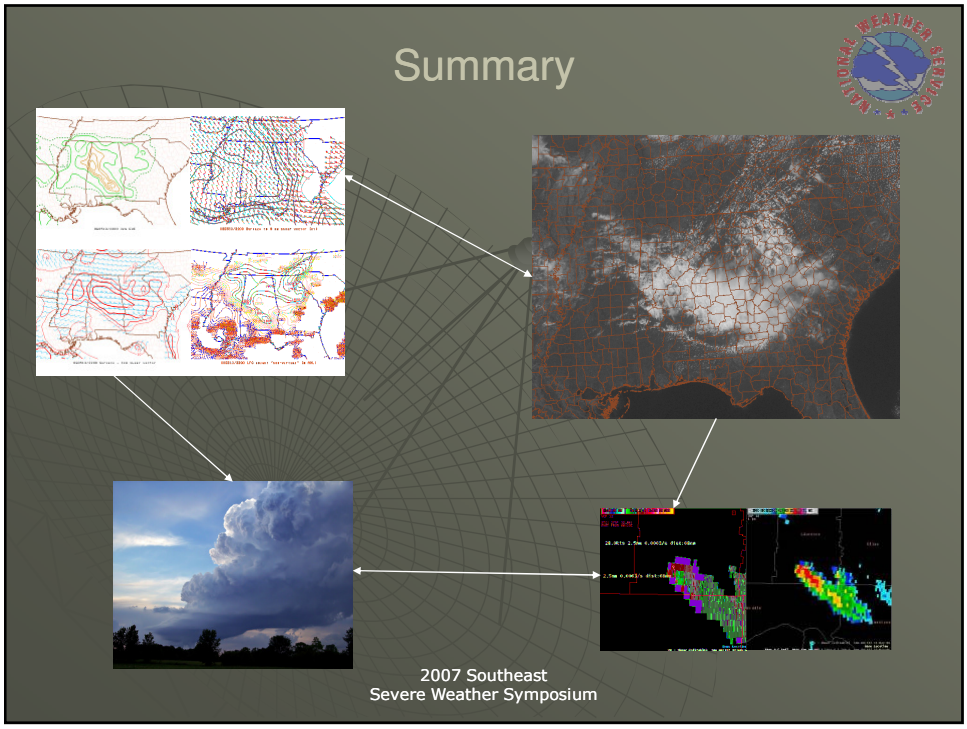
From NWS WDTB training


Summary
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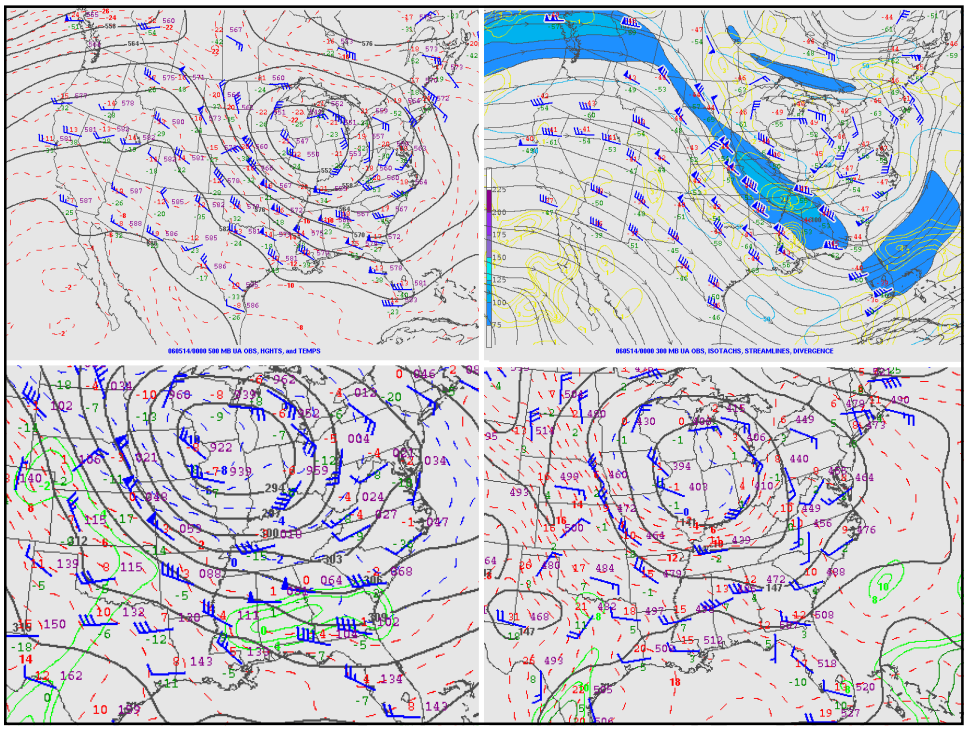

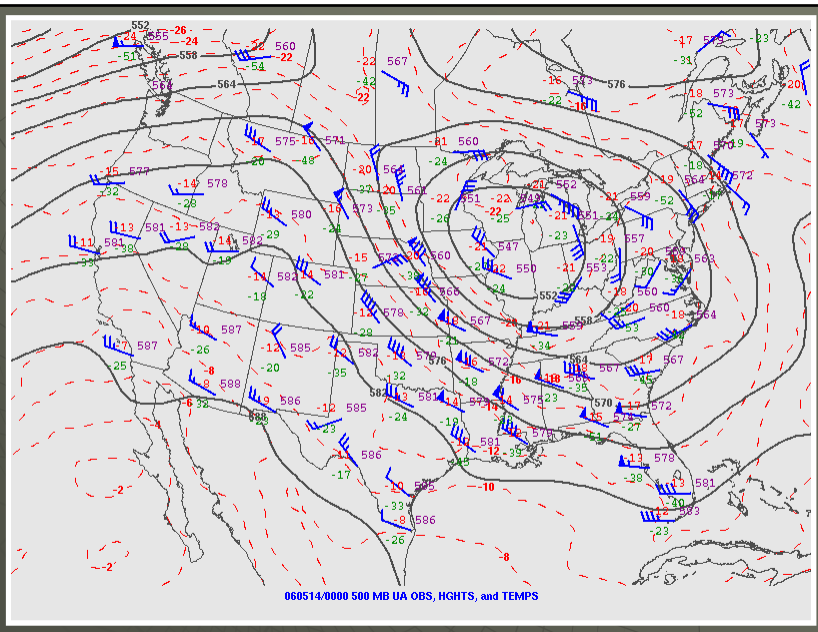

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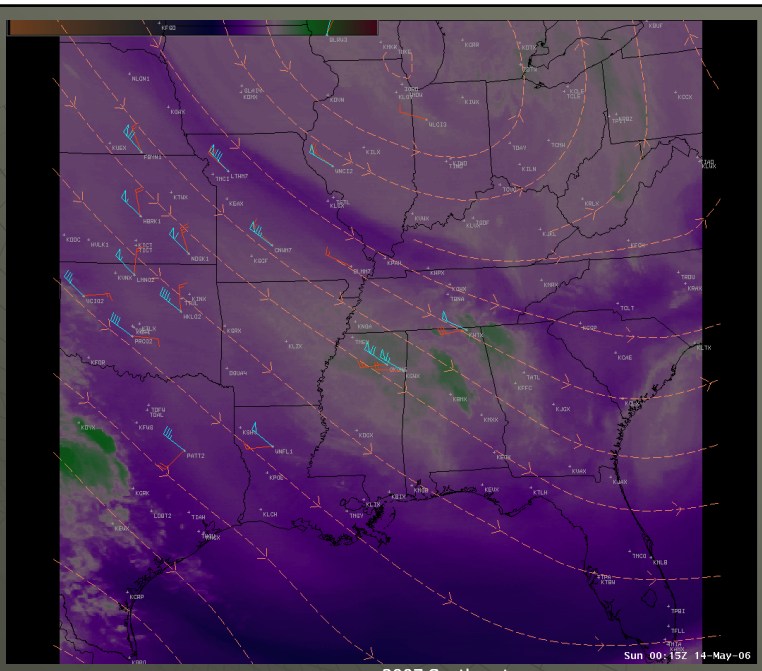

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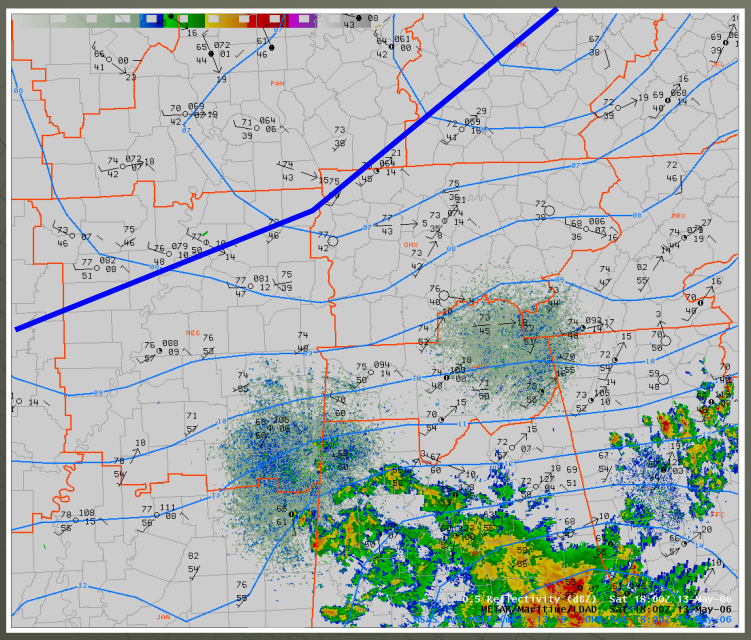

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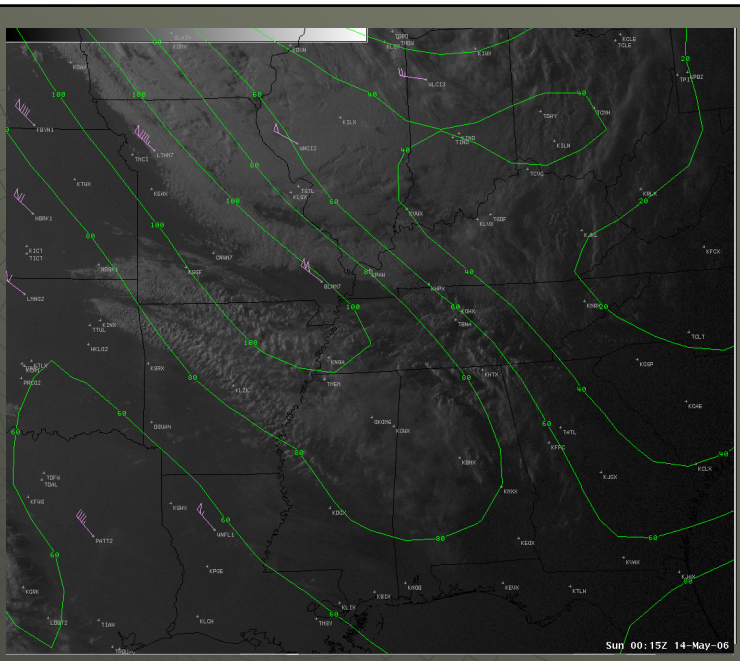

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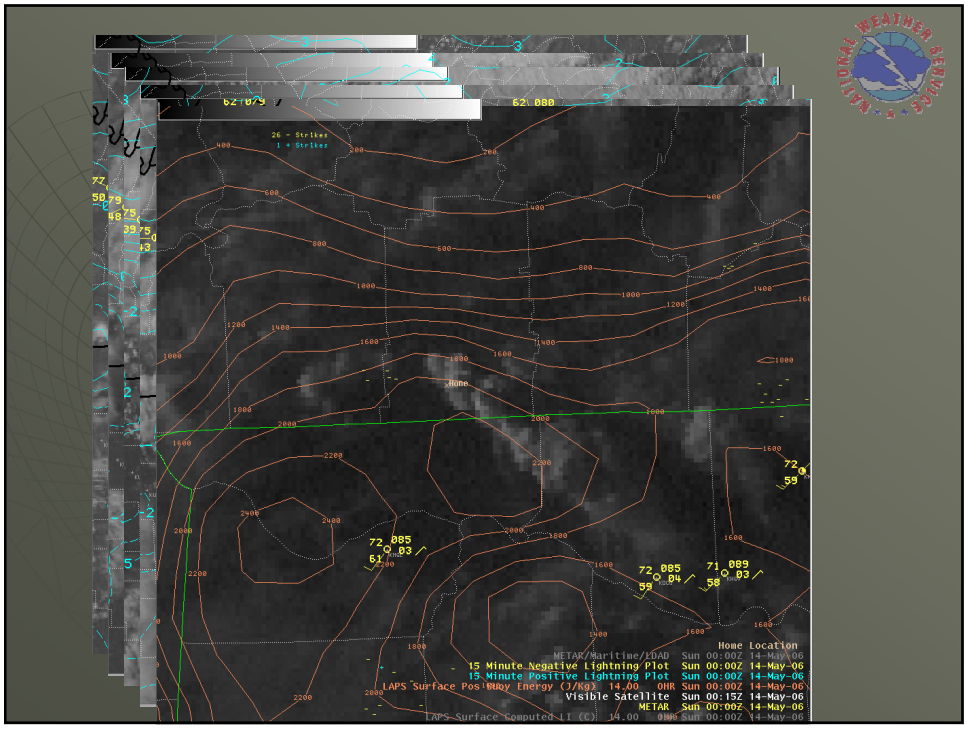

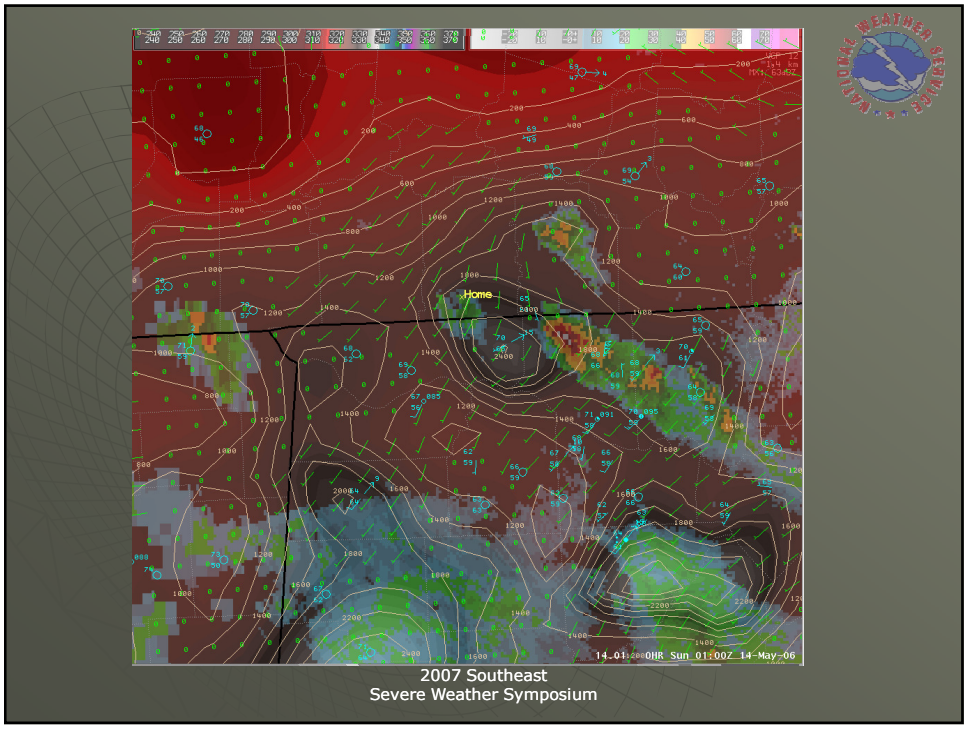

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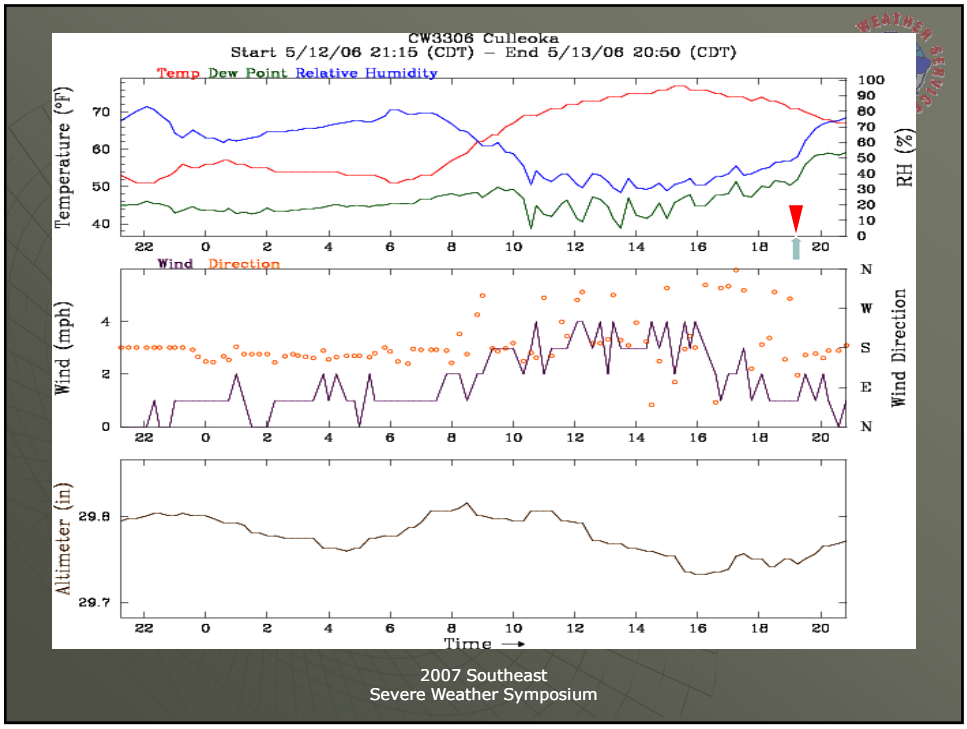

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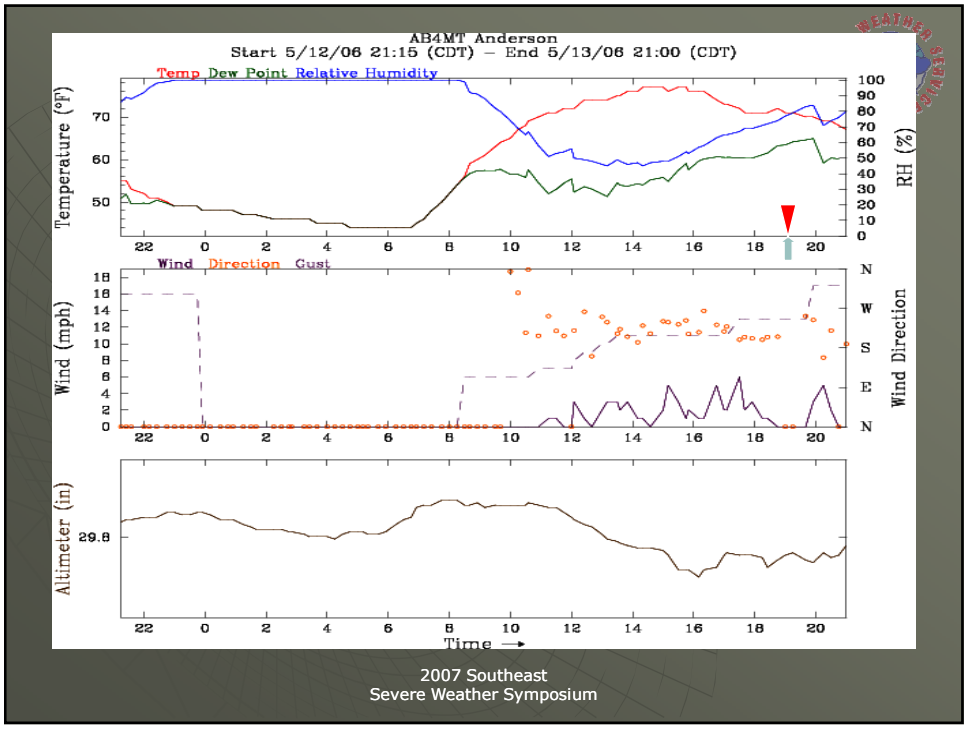

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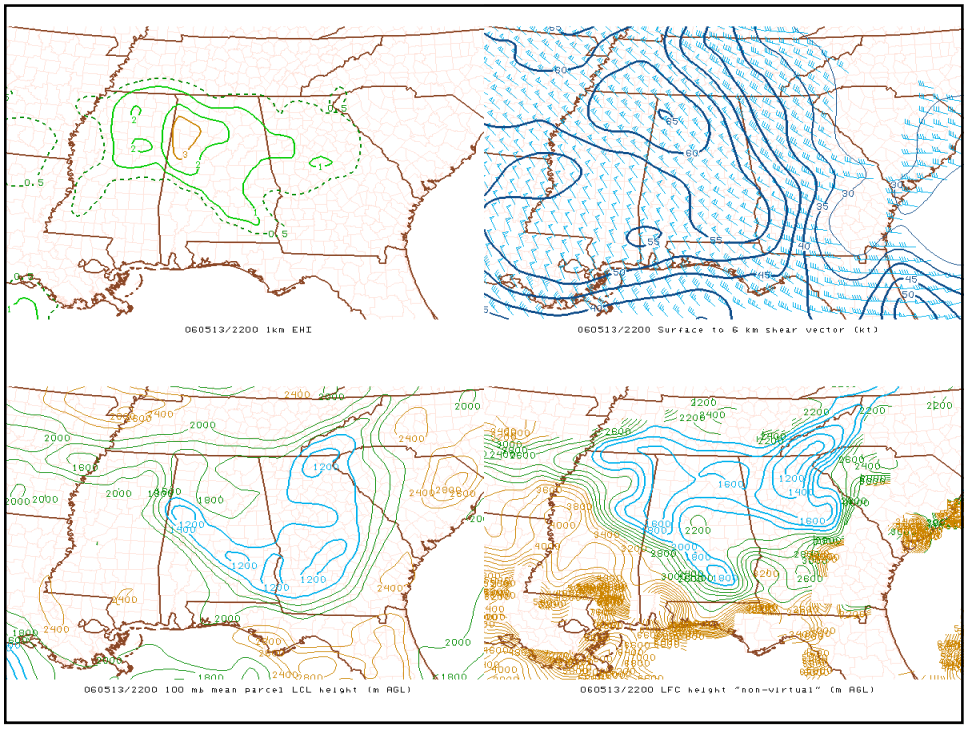
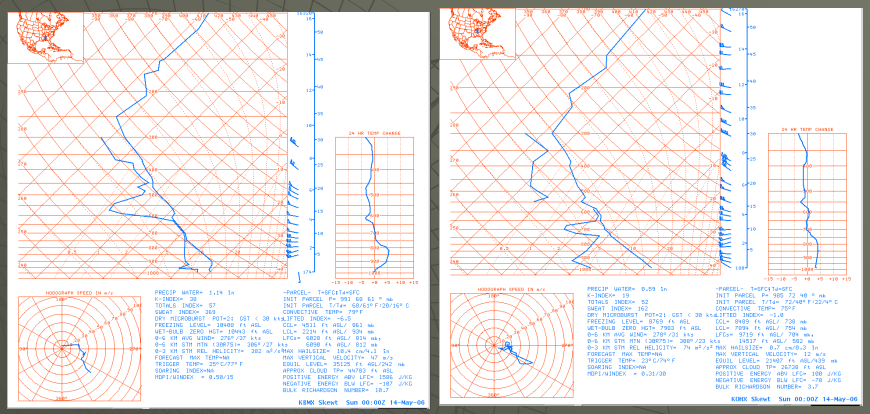


00Z Soundings (storm inbetween)



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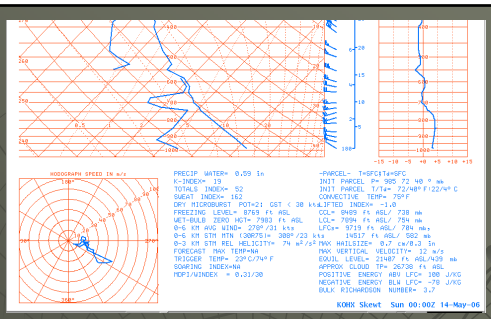

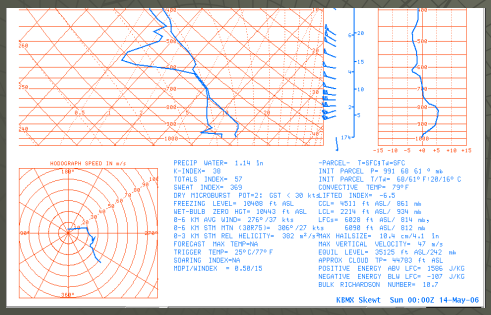

00Z	BMX	OHX
ML-CAPE J/kg	917	16
ML-CIN J/kg	66	111
LFC hgt (m)	1954	4482
3km CAPE J/kg	53	0

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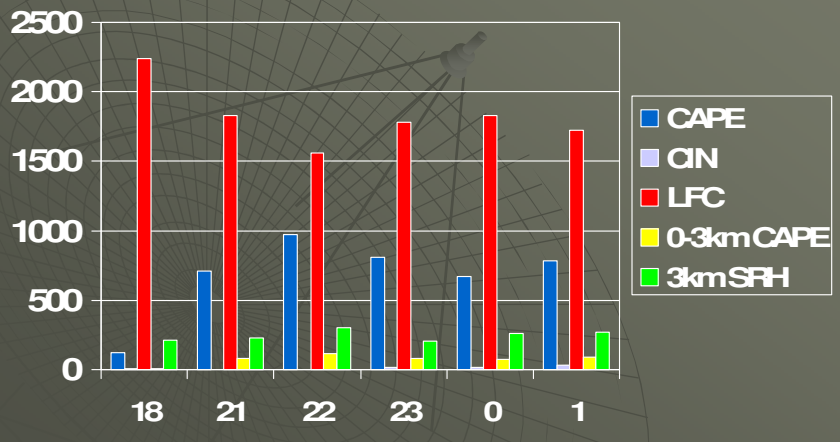
100 mb Mixed Layer	CAPE	CIN	LFC	0-3km CAPE	1/3 km SRH
18Z	119 **397**	6 **0**	2239 **1842**	8 **18**	112 **216**
21Z	711 **1182**	3 **0**	1827 **1666**	82 **118**	91 **225**
22Z	972 **1748**	3 **0**	1557 **1207**	118 **217**	120 **306**
23Z	811 **1644**	16 **31**	1785 **1171**	82 **178**	90 **208**
00Z	672 **1931**	17 **49**	1831 **1176**	71 **228**	125 **261**
01Z	785 **2124**	29 **58**	1720 **1140**	93 **254**	100 **272**

100 mb Mixed Layer Time Series



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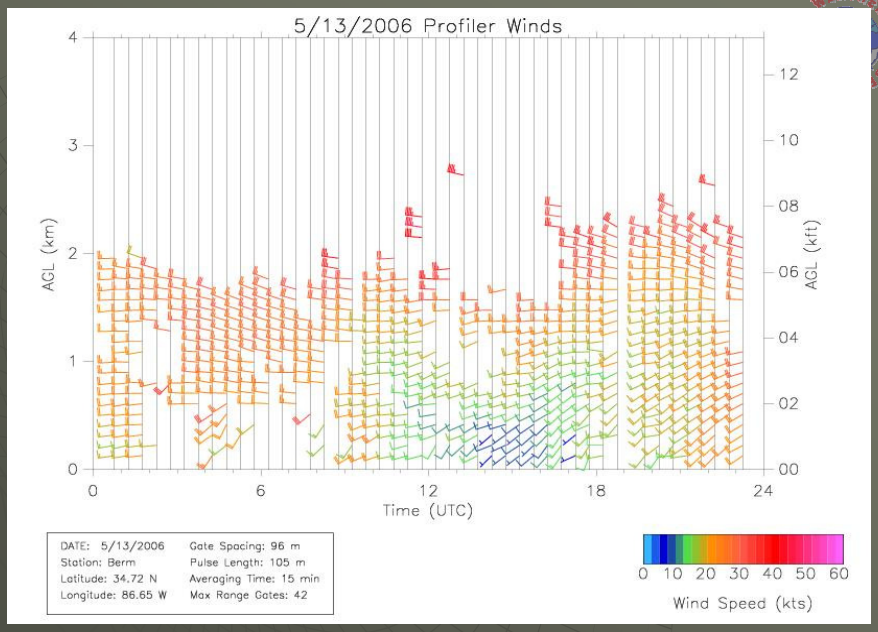

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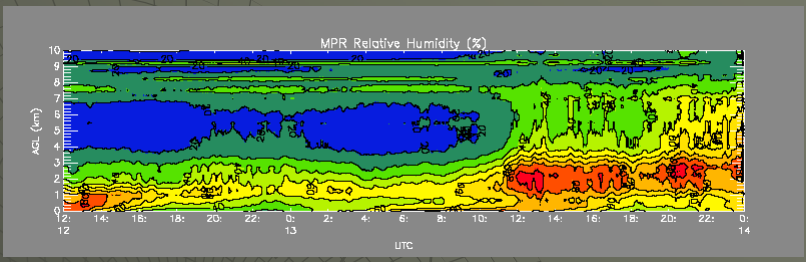
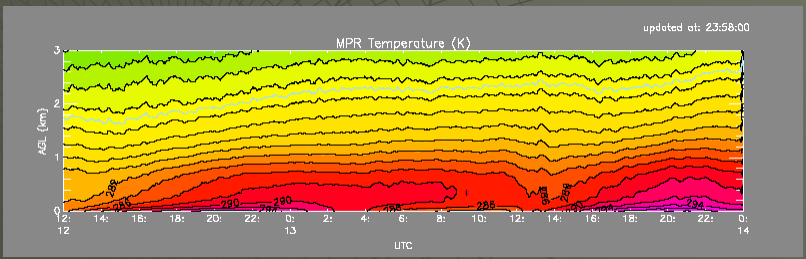
MIPS RH data





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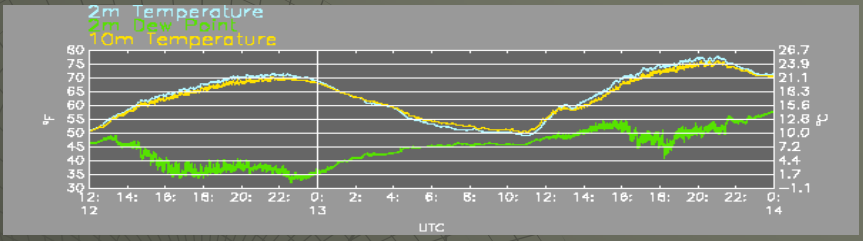
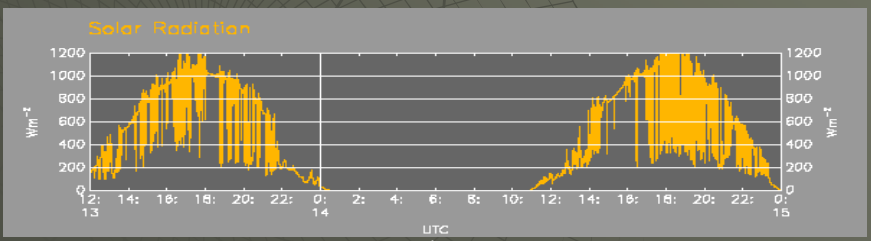
MIPS T/Td and Solar Radiation





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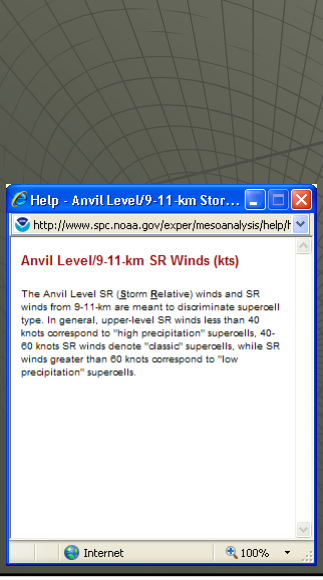
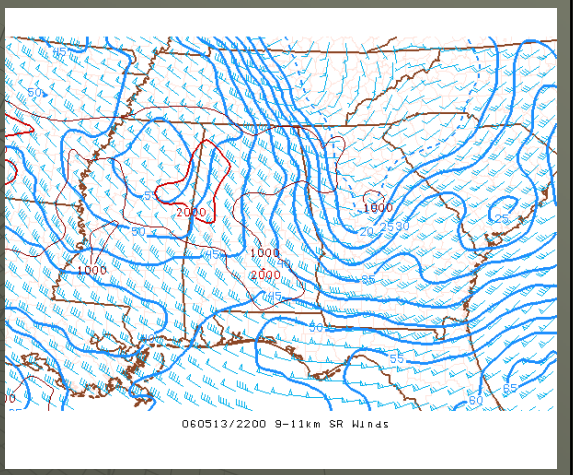
SR-anvil winds





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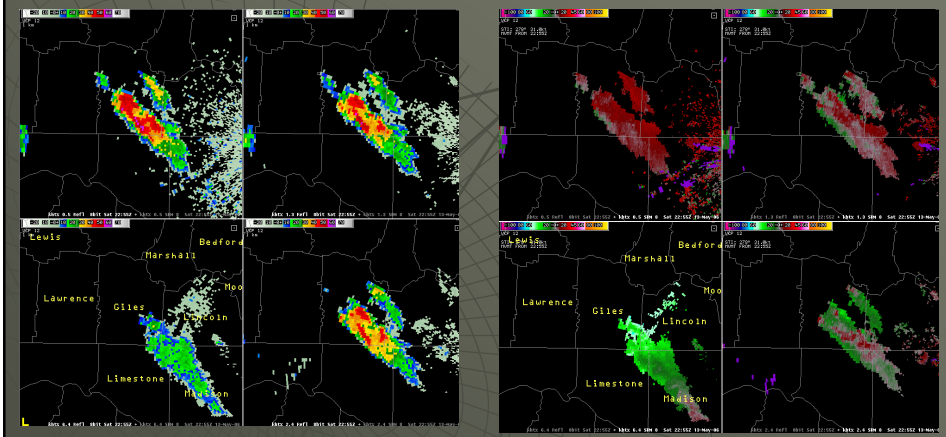
2255Z Giles County Storms



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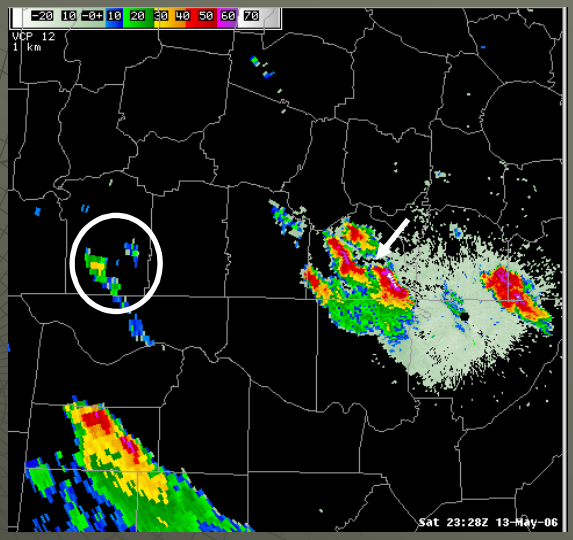
2328Z

Photos courtesy
Erik Perozo



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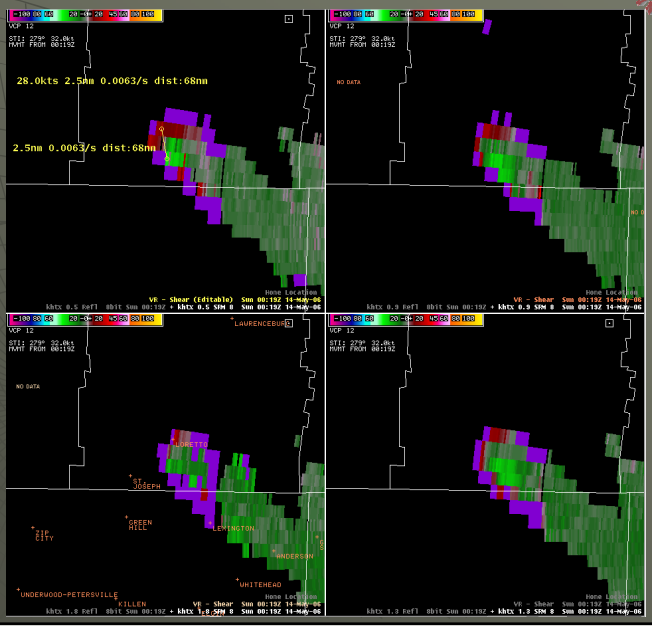
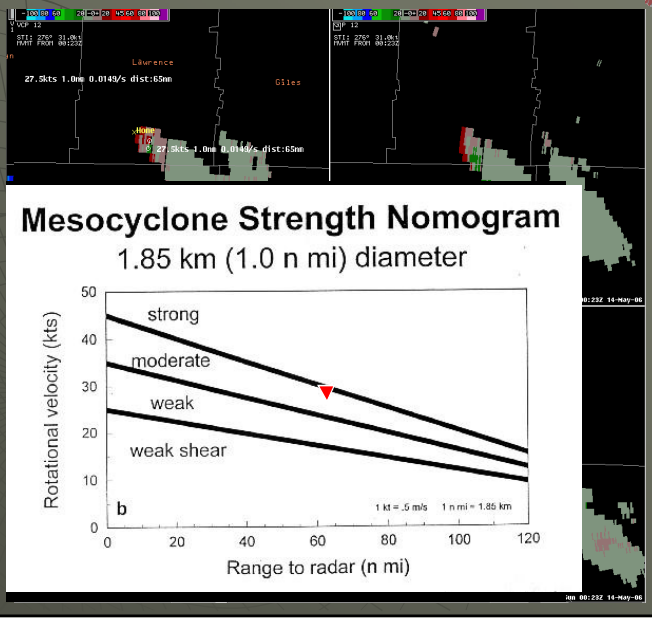
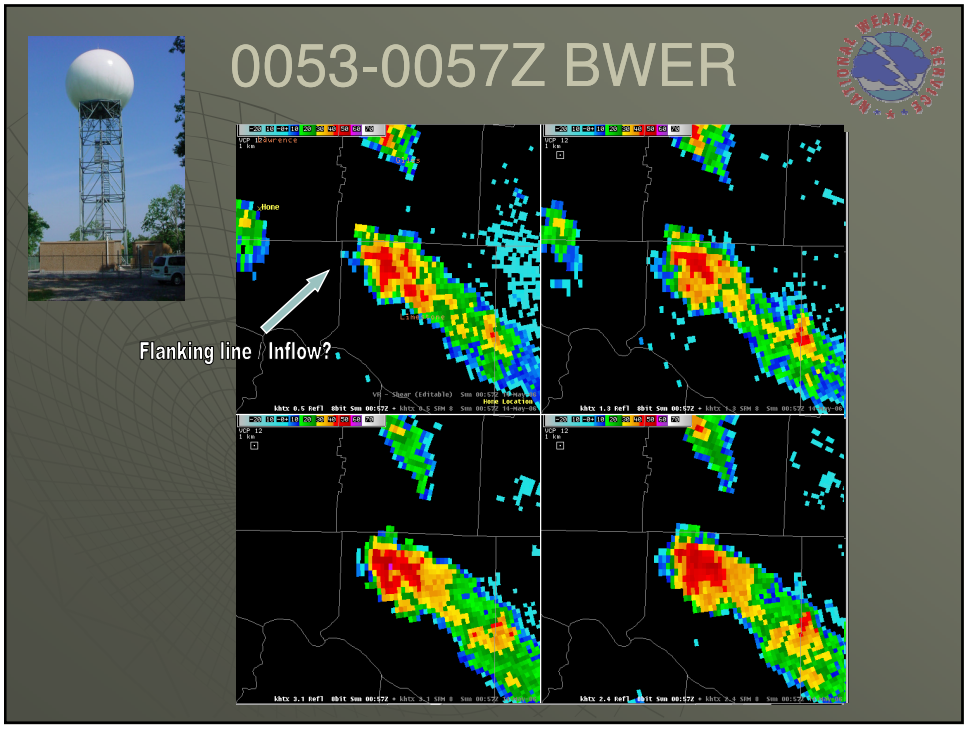
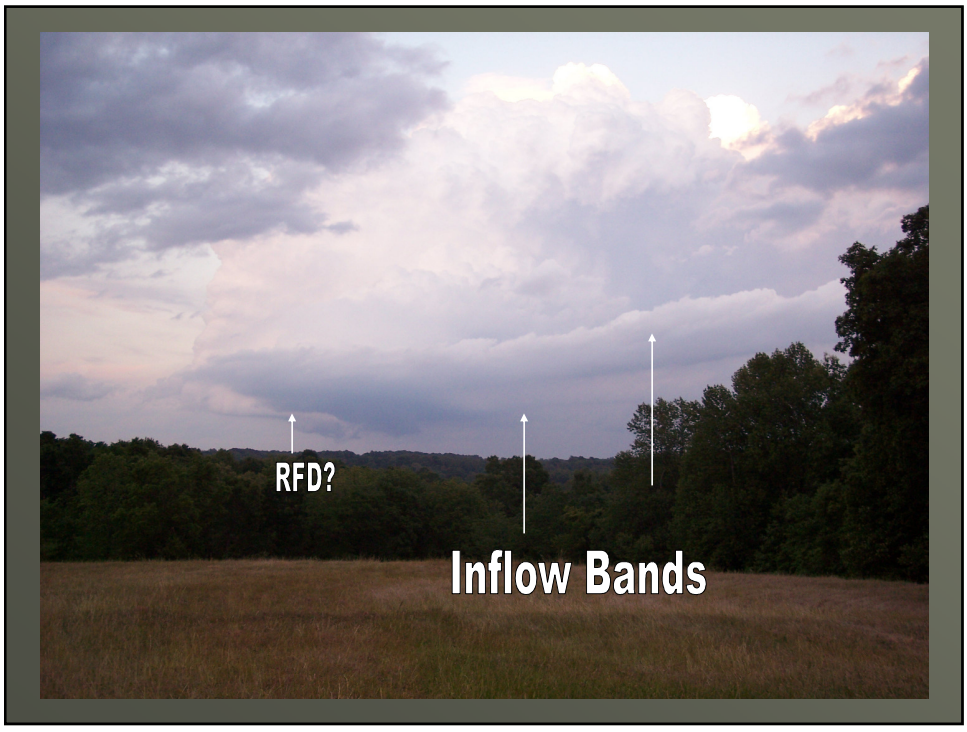
0019Z Z/SRM



0023Z Z/SRM




0053-0057Z BWER
Flanking line / Inflow?


RFD?
Inflow Bands

Storm reports

Tennessee
Lincoln: 0.88 hail (1)
Franklin: 1.00 hail 2)

Alabama
Franklin: 0.88 (1)
Lawrence: 0.88 (1)
Limestone: 0.75 (1) and 1.00 (2)
Madison: 0.75 (1), 0.88 (3), 1.00 (1)
Colbert: 1.75 (1)
Marshall: 0.88 (1)

Concluding notes

Near Storm Environment (NSE)

- Adequate deep layer and low level shear present.
- SR anvil-level flow was below 60kt (suggested for LP supercells).
- Low level moisture advected into near storm environment, including surface inflow layer.
- Result was a lower LFC/LCL and significant increase in (SB,100mb ML, & 0-3km) CAPE.
- Photos (radar) reveal LP (and low topped [illegible] supercell structures (rotating and/or w[illegible]
- Little CG lightning noted. LMA to be studied.

??? Was it surface based ???

Concluding notes

- Communication with spotters/chasers important to identify storm type. Radar not always sufficient.
- Post event analysis/spotter reports revealed this event.

Questions, comments, suggestions?